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Land and Freshwater Mollusca of the Cayman Islands, West Indies

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The Cayman Islands consist of three separate islands: Grand Cayman, Little Cayman and Cayman Brac. Grand Cayman is about 100 miles northwest of Jamaica and 210 miles west-southwest of Cabo Cruz, Cuba. Little Cayman and Cayman Brac are 5 miles apart, and are 60 miles northeast of Grand Cayman.

The total area of these islands is about 100 square miles, Grand Cayman being 76, Cayman Brac about 14 and Little Cayman about 10 square miles.

C. A. Matley (1926, p. 355) described these islands as follows:

"All the islands are low-lying, and do not attain anywhere a height of more than 60 feet above sea-level, except Cayman Brac, the eastern end of which rises to 140 feet. Viewed from the sea they have a general resemblance to the flat-topped islands of the Bahama group. They are formed entirely of calcareous rocks, which the present survey has shown to be separable into two formations. An older limestone, which I call the Bluff Limestone, forms the central and larger part of each island; and a younger formation of consolidated coral-sand and marl, with some limestone, which I call the Ironshore Formation, occupies most of the periphery as a low coastal terrace, which never rises to a greater height than 12 or 15 feet above the sea, and generally terminates abruptly inland against raised marine cliffs of the Bluff Limestone. In addition to the above are the recent deposits which, at sea, are living

coral-reefs that almost surround the islands of Grand Cayman and Little Cayman, but occur only to a limited extent at the south-west of Cayman Brac, and ashore, consist of blown coral-sand and storm-beaches of coral-shingle piled up by winds, storms, and hurricanes on the seaward side of the coastal platform. All the islands are entirely devoid of streams, owing to the porosity of the limestones, and even dry valleys are absent."

The central and elevated portions of these islands are of Miocene age while the coastal platform reaching a height of 12 to 15 feet above the sea is probably Pleistocene as it contains reef-building corals and mollusks which occur in the sea around these islands at the present time.

Matley's statement that "they have a general resemblance to the flat-topped islands of the Bahama group" is misleading as the Bahama Islands, certainly those I have seen, are composed of lithified sand dunes and not of reef formation other than the low coastal limestone. An excellent example is provided by the "Queen's Staircase" in Nassau, New Providence. This is a deep, excavated cut through a lithified dune. Fossil land snails of the genus *Cerion* are to be seen in layers several feet below the surface of the dune.

HISTORICAL

The collections of land and freshwater mollusks of the Cayman Islands are well documented. This is quite different from other islands or island groups in the West Indies where most of the early history has been lost. The collector of only a single species, *Cerion martinianum* Küster, is unknown. Pilsbry (1930, p. 221) has stated "it was probably picked up by a sailor or buccaneer about a hundred years ago and brought to Europe in his chest of shells and curios." Until 1930 only six species of land snails were known from the Cayman Islands.¹

A Mr. Clark P. Streater visited the Cayman Islands sometime prior to 1889 and collected a few mollusks. These were described by Pilsbry. In April 1896 an ornithologist, Mr. Charles B. Taylor from Kingston, Jamaica, also collected a few land mollusks, which were described in 1911 by H. B. Preston.

¹ Not including the numerous "species" of *Cerion* by Maynard.

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These shells Preston had obtained from Rosenberg, a London dealer in bird skins.

During March 1888, Charles Johnson Maynard spent considerable time on Cayman Brac and Little Cayman. He left Kingston, Jamaica, and "took a small schooner for Grand Cayman but prevailed upon the Captain to let him off on Cayman Brac where he spent some time collecting before going to Little Cayman" (Turner 1957, p. 144). He apparently did not go to Grand Cayman, as there are no *Cerion* in his collection from that island.

Maynard's interest in mollusks was limited to the genus *Cerion*, but he would occasionally pick up a few other land mollusks if they were abundant. His collection of *Cerion* was purchased by the Museum of Comparative Zoology and the United States National Museum and divided equally between these two institutions.

Maynard was a "splitter" far beyond what is generally meant by this term. His species concept was that of a single population. In his descriptions he emphasized the slight differences existing between two "species," without mentioning the many specimens that were identical in their characters.

In 1929, H. A. Pilsbry was invited by former Governor Pinchot of Pennsylvania to join him on a trip to the South Seas on the schooner "Mary Pinchot." Several stops were made in the West Indies including the island of Grand Cayman. Several new species of land mollusks from this island were described by Pilsbry as a result of this trip.

The most important expedition to these islands for land mollusks was that of Dr. Paul Bartsch of the United States National Museum and his party during September 1930. Much of both Cayman Brac and Little Cayman was covered, but only the western portion of Grand Cayman was explored. The early part of this extended West Indian trip had been in the southern Bahama Islands.

Ornithologist, James Bond of the Academy of Natural Sciences, Philadelphia, collected birds and land shells in the Cayman Islands in 1930.

In 1938, C. B. Lewis of the Institute of Jamaica, was associated with an Oxford University Biological Expedition. Land shells were collected from all three islands of the Cayman

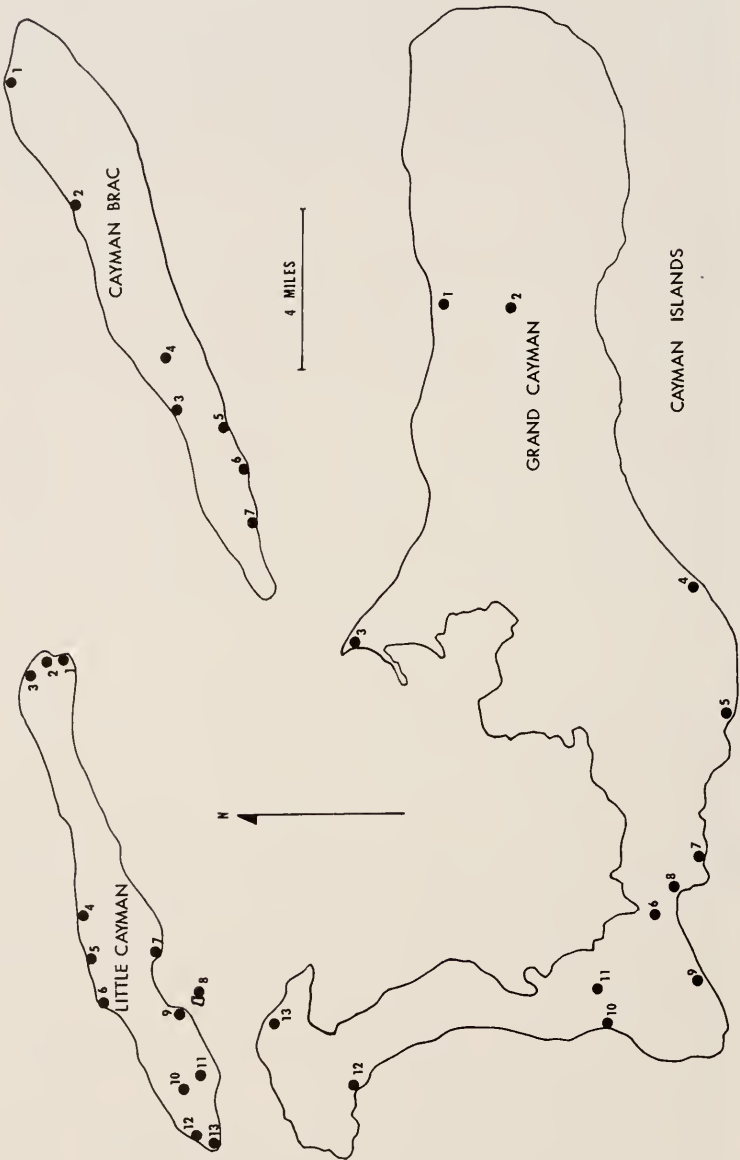


Plate 61. Cayman Islands. Scale accurate, grouping arbitrary.

Plate 61

GRAND CAYMAN

- 1 $\frac{1}{4}$ mile S of north shore
 - 2 Center of island on north-south road which intersects the road paralleling the north shore road at Old Man Bay
 - 3 Rum Point
 - 4 Bodden Town
 - 5 3 miles W of Bodden Town
 - 6 Between North Sound and Red Bay
 - 7 Between George Town and Bodden Town
 - 8 Red Bay
 - 9 Between Southwest Point and Red Bay
 - 10 George Town
 - 11 Between George Town and North Sound
 - 12 $1\frac{1}{2}$ miles E of Northwest Point
 - 13 Between Conch Point and Palmetto Point
- Branching of Forest Glen Road from Further Land Road [not located]

LITTLE CAYMAN

- 1 Near eastern end
- 2 Reef Harbour [also called Snipe Harbour]
- 3 N side near East Point
- 4 N coast opposite Sparrowhawk Hill
- 5 1 mile E of Jackson Point
- 6 E side of Bloody Bay
- 7 Rocky Point
- 8 Owen Island
- 9 Blossom Village
- 10 halfway across island
- 11 N side of first ridge, western end
- 12 N coast near Southwest Point
- 13 Western end

CAYMAN BRAC

- 1 Booby Point
- 2 The Bight
- 3 Stake Bay
- 4 Road crossing island from Custom House
- 5 S end of Bluff Road from Stake Bay
- 6 At lagoon, southwest coast
- 7 2 miles E of Southwest Point

group and were reported upon by Pilsbry in 1942. Again in 1940, Lewis spent one week on Cayman Brac while en route to the Pedro and Morant Cays on behalf of the Jamaican Government. Material from this trip was also reported upon by Pilsbry in 1949.

Charles B. Wurtz spent one day on Grand Cayman while on a collecting trip, the Catherwood-Chaplin West Indies Expedition, 1948. He described four new species from this island.

ACKNOWLEDGMENTS

My sincere thanks are due to Dr. R. T. Abbott of the Academy of Natural Sciences, Philadelphia for the loan of many species from these islands. I am particularly indebted to Dr. H. A. Rehder of the United States National Museum for the loan of the material collected by Paul Bartsch and his party in 1930. To Dr. Grace Hunter of the Stranahan High School, Fort Lauderdale, Florida, I am indebted for eight lots of *Cerion* from Cayman Brac which she collected during a brief trip to this island in July 1963.

I am indebted to my colleagues, Dr. Ruth D. Turner and Mr. Richard I. Johnson for reading the manuscript.

ABBREVIATIONS

Academy of Natural Sciences of Philadelphia	ANSP
Museum of Comparative Zoology	MCZ
United States National Museum	USNM

NOTES ON THE LAND AND FRESHWATER MOLLUSKS

The fauna of land mollusks of the Cayman Islands is disharmonic, judging by the relationships of the endemic species and the origin of the non-endemic elements. Thirty out of the forty-eight recorded species are endemic and seventeen of these show a relationship with species of Jamaica, ten with Cuba, two with Central America, and one with the Isle of Pines.

Pilsbry has stated (1930, p. 226) that Grand Cayman was at one time connected with Jamaica, but the relationships given above hardly warrant this assumption. See also notes at end of this report for the relationships of the reptiles, amphibians and butterflies of these islands. Pilsbry's statement relative to this land connection was based entirely upon the evidence of

relationships of the several species of land shells concerned and not upon any geological evidence other than a few speculative remarks.

We give below the comparisons of the land snail fauna of two island groups, the Caymans and the Crooked Island Group in the Bahamas. This comparison is given to indicate the factors of time, of distance from other islands, and of square mile area. So far as I am able to tell from the data available to me, the differences in the ecological niches are far more favorable in the Crooked Island Group than in the Cayman Islands.

There are two species of freshwater mollusks, *Biomphalaria havanensis* and *Drepanotrema lucidum* found in a well and in a solution hole, the remainder are all land.

Comparison of the Molluscan Faunas

	widely distributed	limited in distribution	endemic species	total species	area in square miles
Crooked Island group	25	3	20	48	219
Cayman Islands	11	6	30 *	48	100

* One "endemic" species, *Choanopoma caymanense* Pilsbry, is not included as it has never been recorded since it was described in 1891 and it may not be from the Caymans.

In the tabulation given above, both island groups have the same number of species; the Caymans have one-third more endemic species, but with only half the land area. In addition, the Crooked Island group is much nearer other islands and island groups than are the Caymans, and they also have more types of ecological areas for the successful introduction of species which have arrived by fortuitous means. This would seem to indicate that the factor of time has played its part, and the smaller area and the greater distance from other land areas were somewhat offset by the longer existence of the Caymans as a habitable area. The large number of endemic species is possibly due to the greater age of these islands as compared with the Crooked Island group in the Bahamas (Clench 1963). The fauna on the Crooked Island group possibly dates only from the Pliocene or early Pleistocene, as prior to that time these islands had been covered with water during a positive eustatic oceanic level.

DISTRIBUTION WITHIN THE CAYMAN ISLANDS

	Grand Cayman	Little Cayman	Cayman Brac
<i>Eurochatella fisheri</i>	X		
<i>Helicina fasciata substriata</i>	X	X	X
<i>Alcudia lewisi</i>		X	X
<i>Lucidella caymanensis</i>		X	X
<i>Stoastoma atomus</i>	X		
<i>Cyclopilsbrya fonticula</i>	X		
<i>Chondropoma caymanense</i>	X		
<i>Chondropoma caymanbracense</i>			X
<i>Chondropoma caymanbracense parvicaymanense</i>		X	X
<i>Tudora rosenbergiana</i>	X		
<i>Gcomelania alemon</i>	X		
<i>Biomphalaria havanensis</i>	X		
<i>Drepanotrema lucidum</i>	X		
<i>Veronicella laevis</i>	X		
<i>Succinea latior</i>	X		
<i>Gastrocopta rupicola marginalba</i>	X	X	
<i>Gastrocopta pellucida</i>	X	X	X
<i>Pupoides albilabris</i>		X	
<i>Strobilops wenziana</i>	X		
<i>Strobilops hubbardi</i>		X	
<i>Cecilioides iota</i>	X	X	
<i>Lamellaxis gracilis</i>	X		
<i>Lamellaxis micrus</i>	X		
<i>Synopeas pumilum</i>	X		
<i>Subulina octona</i>	X		
<i>Spiraxis subrectaxis</i>	X		
<i>Spiraxis caymanensis</i>	X		
<i>Varicella caymanensis</i>	X	X	X
<i>Varicella pinchoti</i>	X		
<i>Varicella infantia</i>	X		
<i>Varicella adolescentia</i>	X		
<i>Melaniella gracillima</i>		X	X
<i>Lacteoluna summa</i>	X		
<i>Lacteoluna caymanensis</i>	X		
<i>Lacteoluna steveni</i>	X		
<i>Lacteoluna trochella</i>	X		
<i>Lacteoluna caymanbracensis</i>		X	X
<i>Proserpimula lewisi</i>		X	X
<i>Orthalicus jamaicensis</i>	X		
<i>Cerion pannosum</i>		X	X
<i>Cerion martinianum</i>	X		
<i>Cerion nanus</i>		X	
<i>Microceramus caymanensis</i>	X	X	X
<i>Pineria perpusicillus</i>	X		
<i>Brachypodella caymanensis</i>	X	X	X
<i>Hemitrochus streator</i>	X	X	X
<i>Hemitrochus lewisiana</i>	X		
Total number of species	36	18	14

LIST OF THE SPECIES KNOWN FROM THE CAYMAN ISLANDS

HELICINIDAE

***Eutrochatella fisheri* Pilsbry**

Pyrgodomus fisheri Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 243, pl. 15, fig. 3 (Swan Island near radio station). [Holotype, ANSP no. 150868]; Wurtz 1950, Proc. Acad. Nat. Sci. Philadelphia **102**: 102.

Remarks. This minute species was found on Grand Cayman by Wurtz (1950, p. 102). He could not differentiate it from Swan Island specimens.

Eutrochatella fisheri is rather close in its relationships with *E. rupestris* Pfeiffer from Cuba, differing by being smaller and having a weaker sculpture of spiral threads.

Specimens examined. GRAND CAYMAN: $\frac{1}{4}$ mile S of north shore (ANSP).

***Helicina fasciata substriata* Gray**

Helicina substriata Gray 1825, Zool. Jour. **1**: 66, pl. 6, fig. 4 (West Indies).

Helicina fasciata caymanensis Pilsbry 1949, Nautilus **63**: 40, pl. 3, fig. 7 (Cayman Brac). [Holotype, ANSP no. 187666.]

Remarks. The Cayman Brac form was separated from *substriata* of the Lesser Antilles on the basis of having more "broadly rounded" whorls. In a large series of *substriata*, however, broadly rounded specimens occur which are identical to the Cayman specimens.

Specimens examined. GRAND CAYMAN: George Town (MCZ; USNM); between North Sound and Red Bay (ANSP).

LITTLE CAYMAN: north coast near Southwestern Point; Blossom Village; north side near East Point; east of Reef Harbour entrance (all USNM).

CAYMAN BRAC: (MCZ; ANSP); road crossing island at Custom House; Booby Point (both USNM).

***Alcaldia lewisi* Pilsbry**

Alcaldia lewisi Pilsbry 1942, Nautilus **56**: 4, pl. 1, fig. 4 (bush road behind Stakes Bay, Cayman Brac). [Holotype, British Museum.]

Remarks. In relationship, this species is nearest to *Alcaldia minima* (d'Orb.), a species widely distributed throughout Cuba. *A. lewisi* differs by being less than half the size and in having a weak basal lip notch.

Specimens examined. LITTLE CAYMAN: N side of first ridge, western end; E of Reef Harbour entrance; Blossom Village; N side near East Point (all USNM).

CAYMAN BRAC: Booby Point; road across island at Custom House (both USNM); behind Stakes Bay (ANSP).

***Lucidella caymanensis* Pilsbry**

Lucidella caymanensis Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 230, pl. 15, figs. 1-1b (road between North Sound and George Town, Grand Cayman). [Holotype, ANSP no. 150867.]

Remarks. This species is closely related to *Lucidella pilsbryi* Clapp from Swan Island, differing by being far more depressed. Both of these species are related to *L. lineata* C. B. Adams of Jamaica which differs by having a small apertural tooth within the outer lip, as well as a much larger basal tooth.

Specimens examined. GRAND CAYMAN: road between North Sound and George Town (ANSP; MCZ).

LITTLE CAYMAN: E of Reef Harbour entrance; half way across island at western end (both USNM).

CAYMAN BRAC: Booby Point (USNM).

***Stoastoma (Blandia) atomus* Pilsbry**

Stoastoma (Blandia) atomus Pilsbry 1930, Proc. Acad. Nat. Science Philadelphia **82**: 230, pl. 15, figs. 4-4b (road between North Sound and George Town, Grand Cayman). [Holotype, ANSP no. 150863.]

Remarks. Pilsbry states that this species is close in its relationship to *Stoastoma blandiana* C. B. Adams from Manchester, Jamaica, having the same shape but being very much smaller.

CYCLOPHORIDAE

***Cyclopilsbrya fonticula* Preston**

Neocyclotus fonticulus Preston 1911, Proc. Malac. Soc. London **9**: 359, text fig. (Grand Cayman).

Poteria caymanensis Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 227, pl. 18, figs. 4-5 (1 mile S of George Town, Grand Cayman). [Holotype, ANSP no. 150857.]

Poteria laevitesta Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 227, pl. 16, figs. 18-18a; 19-19a (Grand Cayman). [Holotype, ANSP no. 150657.]

Poteria caymanensis oligoptyx Pilsbry 1942, Nautilus **56**: 2, pl. 1, figs. 12-13a (East End, Grand Cayman). [Holotype, British Museum.]

Cyclopilsbrya (Cyclocaymania) caymanensis (Pilsbry). Bartsch 1942, United States National Mus. Bull. **181**: 80, pl. 13, figs. 7-12.

Cyclopilsbrya (Cyclocaymania) fonticula (Preston). Bartsch 1942, United States National Mus. Bull. **181**: 81, pl. 13, figs. 13-18; pl. 42, figs. 6-7.

Cyclopilsbrya (Cyclocaymania) laevitesta (Pilsbry). Bartsch 1942, United States National Mus. Bull. **181**: 82, pl. 13, figs. 22-24.

Poteria fonticula (Preston). Wurtz 1950, Proc. Acad. Nat. Sci. Philadelphia **102**: 102.

Remarks. I am in full agreement with Wurtz (1950, p. 102) that no real distinctions exist among the various specimens which have been named as "species" given in the synonymy above.

Bartsch (1942) created a number of new genera and subgenera for various species in this complex which have been grouped previously in the genus *Poteria*. His generic characters were based upon sculpture and minor morphological differences in the opercula. The validity of these names will have to remain in abeyance until we have far more knowledge of the soft anatomy.

In the Caymans the genus *Cyclopilsbrya* occurs only on Grand Cayman. In relationship, *C. fonticula* is close to species found in western Jamaica.

Specimens examined. GRAND CAYMAN: (MCZ; ANSP; USNM; James Poling); between George Town and Bodden Town (USNM).

CHONDROPOMIDAE

Chondropoma caymanense Preston

Chondropoma caymanense Preston 1911, Proc. Malac. Soc. London **9**: 360, text fig. (Grand Cayman).

Remarks. This species is closely related to *C. caribbeum* Clapp from Little Swan Island. In *C. caymanense* the sculpture is coarser and the spiral threads are particularly strong. These

species are related to the *Chondropoma poeyanum* d'Orb. complex of Cuba.

Specimens examined. GRAND CAYMAN: (MCZ); Bodden Town (ANSP; USNM).

***Chondropoma caymanbracense* Pilsbry**

Chondropoma caymanbracense Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 352, pl. 30, fig. 1 (Cayman Brac). [Holotype, ANSP no. 151796.]

Remarks. This is a larger species than *C. caymanense* and with a more globose body whorl. This species is related to the *C. poeyanum* complex of Cuba.

Specimens examined. CAYMAN BRAC: road crossing island at Custom House; Booby Point; at lagoon, southwest coast (all USNM); behind Stake Bay (ANSP).

***Chondropoma caymanbracense parvicaymanense* Pilsbry**

Chondropoma parvicaymanense Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 352, pl. 30, fig. 5 (Little Cayman). [Holotype, ANSP no. 13590.]

Specimens examined. LITTLE CAYMAN: (MCZ); western end; E of Reef Harbour entrance; Owen Island; near eastern end; Blossom Village (all USNM).

***Choanopoma caymanense* Pilsbry**

Choanopoma caymanensis Pilsbry 1891, Nautilus **5**: 83, (Cayman Islands); Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 352, pl. 30, figs. 2-3. [Holotype, ANSP no. 105773.]

Remarks. It is quite possible that this species did not come from the Cayman Islands. It has not been collected by any of the several collecting parties since Pilsbry published this species in 1891.

***Tudora (Colobostylus) rosenbergiana* Preston**

Choanopoma rosenbergianum Preston 1911, Proc. Malac. Soc. London **9**: 359, text fig. (Grand Cayman).

Choanopoma caymanicola Pilsbry 1928, Nautilus **42**: 68 (Grand Cayman). [Holotype, ANSP no. 145014.]

Colobostylus rosenbergianus caymanicola Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 229, pl. 16, fig. 14.

Colobostylus rosenbergianus boddensis Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 228, pl. 16, figs. 3-6 (west end of Bodden Town, Grand Cayman). [Holotype, ANSP no. 150933.]

Remarks. This species appears nearest to *C. retrorsus* C. B. Adams from Jamaica.

Specimens examined. GRAND CAYMAN: Bodden Town (ANSP; USNM); $\frac{1}{4}$ mile S of North Shore (ANSP).

TRUNCATELLIDAE

Geomelania (*Merrilliana*) *alemon* Pilsbry

Geomelania alemon Pilsbry 1942, Nautilus **56**: 3, pl. 1, fig. 9 (Boilers, near George Town, Grand Cayman). [Holotype, British Museum.]

Geomelania (*Merrilliana*) *alemon* Pilsbry. Clench and Turner 1948, Occasional Papers On Mollusks **1**: 182.

Remarks. Marine species in this family are not included. *Geomelania alemon* appears nearest in relationship to *G. pygmaea* (C. B. Ad.) from Jamaica. It is similar in size and sculpture, but differs in having the aperture extending out beyond the body whorl.

Specimens examined. GRAND CAYMAN: near George Town (ANSP).

PLANORBIDAE

The two following species are the only freshwater mollusks recorded for these islands. This is completely understandable for an area with no permanent freshwater owing to the porosity of the limestone.

Biomphalaria havanensis Pfeiffer

Planorbis havanensis Pfeiffer 1839, Archiv für Naturgeschichte **5**: 354 (Cuba).

Planorbis terverianus d'Orbigny 1841 [in] de la Sagra, Histoire de l'île de Cuba, Paris. Mollusques **1**: 194, pl. 13, figs. 20, 23 (Habana, Cuba).

Planorbis maya Morelet 1849, Testacea Noviss. Insulae Cubanae Amer. Centr. **1**: 16 (city of Campeche [Mexico]).

Planorbis liebmanni Dunker 1850 [in] Martini-Chemnitz, Systematisches Conchylien-Cabinet (2) **1**: pt. 17, p. 59, pl. 10, figs. 32-34 (Veracruz [Mexico]).

Tropicorbis havanensis insularum Pilsbry 1942, Nautilus **56**: 8 (cow well,

Further Land Road, north side area, Grand Cayman). [Holotype, British Museum.]

Taphius havanensis Pfeiffer. Paraense and Deslandes 1958, Rev. Brasil. Biol. **18**: 87-91.

Remarks. Pilsbry (1942, p. 8) admitted that "these small planorbs may represent a dwarf ecologic form rather than a true subspecies, but as it has been found only in a single place, it seems simpler to give it a varietal name."

Biomphalaria havanensis is a widely distributed species in the West Indies and Central America. Like most of our fresh-water pulmonates, no two populations are exactly the same. It serves little purpose, however, to give names to these slightly divergent populations.

Barbosa (1961) and others have indicated recently their preference for the generic name *Biomphalaria* for this and several other species, even though it is not the earliest name. Both *Planorbina* Haldeman 1842 and *Taphius* H. and A. Adams 1855 predate *Biomphalaria* Preston 1910. *Biomphalaria* is now widely used by medical parasitologists for the intermediate hosts of *Schistosoma mansoni*. The question regarding the use of *Biomphalaria* has been placed before the International Commission on Zoological Nomenclature.

Drepanotrema lucidum Pfeiffer

Planorbis lucidus Pfeiffer 1839, Archiv für Naturgeschichte **5**: 354 (Cuba).

Planorbis lanierianus d'Orbigny 1841 [in] de la Sagra, Histoire de l'Île de Cuba, Paris. Mollusques **1**: 195, pl. 14, figs. 1-4 (Havana, Cuba). Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 239 (about $\frac{1}{2}$ mile from North Sound, Grand Cayman).

VERONICELLIDAE

Veronicella laevis Blainville

Veronicella laevis Blainville 1817, Jour. Phys. **85**: 440, fig. II-4 (Jamaica).

Veronicella laevis Blainv., var. Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 239 (midway between North Sound and Red Bay, Grand Cayman).

Remarks. According to H. B. Baker's anatomical notes which Pilsbry quotes, the specimen differed somewhat from typical *laevis* from Jamaica.

SUCCINEIDAE

***Succinea latior* C. B. Adams**

Plate 62, fig. 2

Succinea latior C. B. Adams 1849, Contributions to Conchology, pt. 3, p. 38 ([Montego Bay] Jamaica). [Holotype, MCZ no. 247408]; Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 238 (road between George Town and North Sound, Grand Cayman).

Remarks. We have not seen specimens of this species from the Cayman Islands. The lectotype, here selected, from Jamaica is figured.

PUPILLIDAE

***Gastrocopta rupicola marginalba* Pfeiffer**

Pupa marginalba Pfeiffer 1840, Archiv für Naturgeschichte **1**: 253 (Cuba).

Gastrocopta rupicola marginalba Pfr. Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 238 ($\frac{1}{2}$ mile from North Sound, Grand Cayman).

Remarks. This subspecies is widely distributed in the West Indies.

Specimens examined. LITTLE CAYMAN: south side of island (USNM).

***Gastrocopta pellucida* Pfeiffer**

Pupa pellucida Pfeiffer 1841, Symbolae ad Historiam Heliceorum **1**: 46 (Cuba).

Gastrocopta pellucida Pfr. Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 238 ($\frac{1}{2}$ mile from North Sound, Grand Cayman).

Remarks. A species of wide distribution in the West Indies and Mexico

Specimens examined. LITTLE CAYMAN: E of Reef Harbour entrance (USNM).

CAYMAN BRAC: road across island from Custom House; Booby Point (both USNM).

***Pupoides albilabris* C. B. Adams**

Cyclostoma marginata Say 1821, Jour. Acad. Nat. Sci. Philadelphia **2**: 171 (Upper Missouri).

Bulimus nitidulus Pfeiffer 1839, Archiv für Naturgeschichte **5**: 352 (Cuba); non *B. nitidulus* Beck 1837.

Pupa albilabris C. B. Adams 1841, American Jour. Sci. Arts **40**: 271, new name for *Cyclostoma marginata* Say 1821, non Fischer 1807.

Pupoides albilabris (C. B. Adams). Pilsbry 1948, Acad. Nat. Sci. Philadelphia, Monograph no. 3, 2: 921, fig. 499: 1-7.

Remarks. This species is widely distributed in North America and the West Indies.

Specimens examined. LITTLE CAYMAN: $\frac{1}{2}$ way across island at western end (USNM).

STROBILOPSIDAE

***Strobilops* (*Strobilops*) *wenziana* Pilsbry**

Strobilops wenziana Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia 82: 238, pl. 19, figs. 1-7 (between Red Bay and North Sound, Grand Cayman). [Holotype, ANSP no. 150861.]

Remarks. Pilsbry compares this species with *S. salvini* (Tristram) from the mountain forests of Vera Paz, Guatemala and states also that "I have seen all other American species of this genus, and none is at all like *S. wenziana*."

Specimens examined. GRAND CAYMAN: between North Sound and Red Bay (ANSP).

***Strobilops* (*Discostrobilops*) *hubbardi* Brown**

Helix hubbardi A. D. Brown 1861, Proc. Acad. Nat. Sci. Philadelphia, p. 333, text fig. (Indianola, Calhoun Co., Texas). [Holotype, ANSP no. 124.]

Helix vendryesiana Gloyne 1871, Jour. de Conch. 19: 333 (Jamaica).

Strobilops hubbardi stevensoni Pilsbry 1899, Acad. Nat. Sci. Philadelphia 51: 404 (Miami, Florida).

Remarks. A species of wide distribution from northeastern Mexico, Texas to Georgia and Florida, Bermuda, the Bahamas, Cuba and Jamaica.

Specimens examined. LITTLE CAYMAN: halfway across island at western end (USNM).

CIONELLIDAE

***Cecilioides* (*Karolus*) *iota* C. B. Adams**

Plate 62, fig. 1

Achatina iota C. B. Adams 1845, Proc. Boston Soc. Nat. Hist. 2: 13 (Jamaica).

Cecilioides (Karolus) iota (C. B. Adams). Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 239.

Remarks. It has been known previously only from Jamaica.

Specimens examined. GRAND CAYMAN: $\frac{1}{2}$ mile from North Sound (ANSP).

LITTLE CAYMAN: E of Reef Harbor entrance (USNM).

SUBULINIDAE

The four species given below are among the most widely distributed land pulmonates known.

Lamellaxis gracilis Hutton

Opeas gracile Hutton 1834, Jour. Asiatic Soc. Bengal **3**: 84, 93 (Mirzapur, India); Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 236 (road between George Town and North Sound).

Lamellaxis micrus d'Orbigny

Helix micra d'Orbigny 1835, Mag. de Zool., p. 9 (easternmost foothills of the Andes, not far from Santa Cruz de la Sierra, Bolivia); Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 236 (road between George Town and North Sound; Bodden Town).

Synopeas pumilum Pfeiffer

Helix goodallii Miller 1822, Annals of Philosophy **19**: 381 (Bristol, England), non *H. goodalli* Férussac 1821.

Bulimus pumilus Pfeiffer 1840, Archiv für Naturgeschichte **1**: 252 (Cuba); Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 236 (road between George Town and North Sound; Bodden Town).

Subulina octona Bruguière

Bulimus octonus Bruguière 1789, Encyclopédie Méthodique **1**: 325 (Guadeloupe, Lesser Antilles); Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 236 (road between George Town and North Sound; Bodden Town).

OLEACINIDAE

Spiraxis (Volutaxis) subrectaxis Pilsbry

Spiraxis subrectaxis Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 237, pl. 17, fig. 3 ($\frac{1}{2}$ mile from North Sound, Grand Cayman). [Holotype, ANSP no. 150903.]

Remarks. Both this and the following species are close in their relationship to *S. terebella* of Jamaica.

Plate 62

Fig. 1. *Cecilioides iota* C. B. Adams, Grand Cayman (about 70 \times).

Fig. 2. *Succinea latior* C.B.Adams, Jamaica, holotype, MCZ no. 247408 (5.2 \times).

Fig. 3. *Cerion martinianum caymanense* Pilsbry (= *martineanum*), Grand Cayman, paratype, MCZ no. 88904 (4.2 \times).

Fig. 4. *Cerion martinianum* Küster, N of George Town, Grand Cayman (4.2 \times).

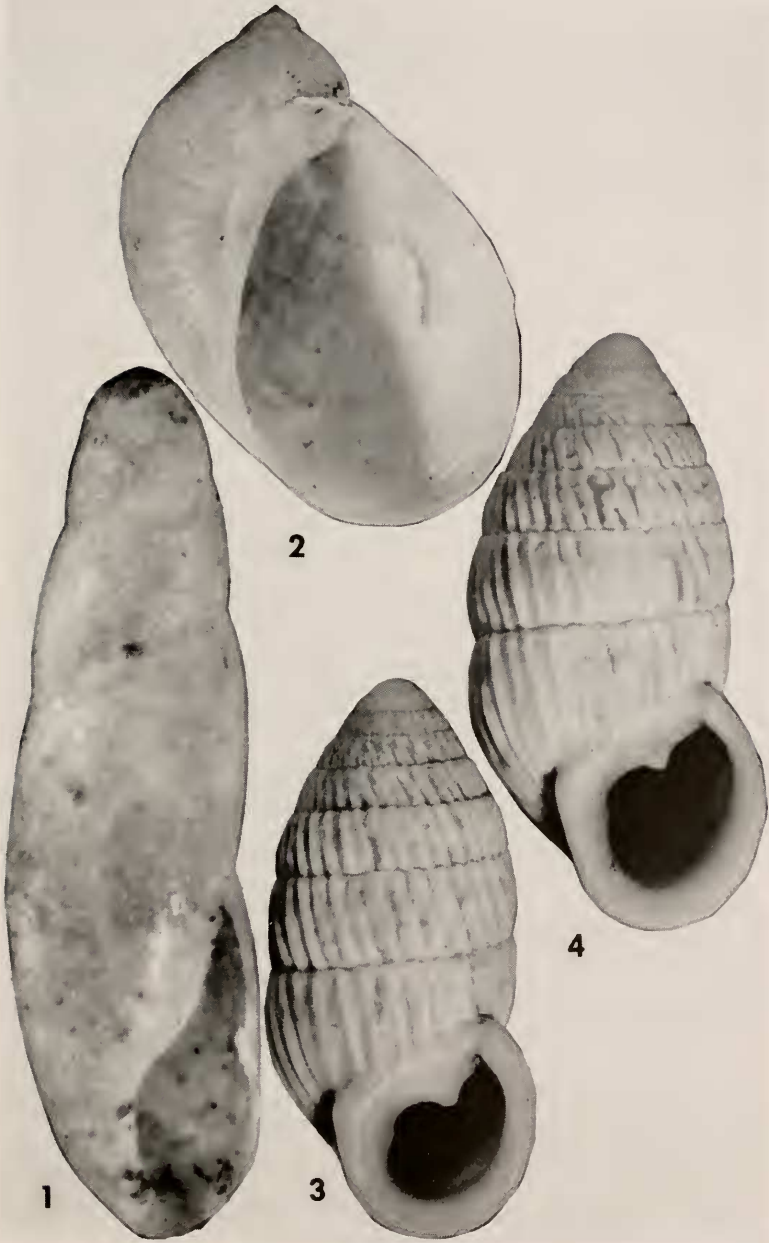


Plate 62

Spiraxis (Volutaxis) caymanensis Pilsbry

Spiraxis (Volutaxis) caymanensis Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 237, pl. 17, figs. 1-2 (between Red Bay and North Sound, Grand Cayman). [Holotype, ANSP no. 150902; paratypes, MCZ no. 85870.]

Varicella (Varicella) caymanensis Pilsbry

Varicella caymanensis Pilsbry 1942, Nautilus **56**: 7, pl. 1, fig. 6 (branching of Forest Glen Road from Further Land Road, north side area, Grand Cayman). [Holotype, British Museum; paratypes, ANSP no. 265779.]

Varicella caymanensis ampla Pilsbry 1942, Nautilus **56**: 8, pl. 1, fig. 5 (branching of Forest Glen Road from Further Land Road, north side area, Grand Cayman). [Holotype, British Museum; paratypes, ANSP no. 265778.]

Varicella lewisi Pilsbry 1949, Nautilus **63**: 47, pl. 3, fig. 6 (Stake Bay below the bluff, Cayman Brac, Cayman Islands). [Holotype, ANSP no. 272751.]

Remarks. From the excellent figures of these two forms it would appear that *ampla* is only a more mature specimen. From a somewhat larger series at hand I cannot separate *V. lewisi* from *V. caymanensis*. Pilsbry relates this species to *V. pinchoti* of Grand Cayman and in turn *pinchoti* to *V. dissimilis* C. B. Adams of Jamaica.

Specimens examined. GRAND CAYMAN: branching of Forest Glen Road from Further Land Road (ANSP).

LITTLE CAYMAN: halfway across island at western end; western end of island (both USNM).

CAYMAN BRAC: behind Stake Bay (ANSP).

Varicella (Varicella) pinchoti Pilsbry

Varicella pinchoti Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 236, pl. 17, fig. 11 ($\frac{1}{2}$ way between Red Bay and North Sound, Grand Cayman). [Holotype, ANSP no. 150886.]

Varicella pinchoti signata Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 237 ($\frac{1}{2}$ way between Red Bay and North Sound, Grand Cayman). [Holotype, ANSP no. 150897, paratype, MCZ no. 85868.]

Remarks. This species is related to *V. dissimilis* Pils. from Jamaica, differing by being smaller, by having more numerous and coarse, axial, incised grooves.

Specimens examined. GRAND CAYMAN: halfway between Red Bay and North Sound (ANSP; MCZ).

Varicella (*Euvaricella*) *infantia* Wurtz

Varicella (Euvaricella) infantia Wurtz 1950, Proc. Acad. Nat. Sci. Philadelphia **102**: 104, pl. 2, fig. 7 (where the north-south road intersects the road paralleling the north shore, Grand Cayman). [Holotype, ANSP no. 186183.]

Remarks. Both this and the following species are related to the *Euvaricella* complex of Jamaica.

Varicella (*Euvaricella*) *adolescentia* Wurtz

Varicella (Euvaricella) adolescentia Wurtz 1950, Proc. Acad. Nat. Sci. Philadelphia **102**: 104, pl. 2, fig. 8 (where the north-south road intersects the road paralleling the north shore, Grand Cayman). [Holotype, ANSP no. 186184.]

Melaniella *gracillima* Pfeiffer

Achatina gracillima Pfeiffer 1839, Archiv für Naturgeschichte **5**: 352 (Cuba).

Varicella gracillima Pfeiffer. Pilsbry 1907, Manual of Conch. (2) **19**: 55, pl. 14, figs. 26, 29-30.

Varicella (Melaniella) caymanbracensis Pilsbry 1949, Nautilus **63**: 48, pl. 3, fig. 5 (Cayman Brac). [Holotype, ANSP no. 187682.]

Remarks. Pilsbry related his *caymanbracensis* to *M. gracillima* but held them distinct. With the present series, however, from both Cayman Brac and Little Cayman I cannot separate the Cayman specimens from the Cuban *M. gracillima* Pfr.

Specimens examined. LITTLE CAYMAN: halfway across island at western end (USNM).

CAYMAN BRAC: S end of bluff road from Stake Bay (ANSP); on road across island from Custom House (USNM).

SAGDIDAE

Lacteoluna (*Stauroglypta*) *summa* Pilsbry

Lacteoluna summa Pilsbry 4930, Proc. Acad. Nat. Sci. Philadelphia **82**: 231, pl. 16, figs. 16-16a (half way between North Sound and Red Bay, Grand Cayman). [Holotype, ANSP no. 150880.]

Remarks. Pilsbry relates this species to *Lacteoluna spreta* C. B. Adams of Jamaica. *L. summa* Pilsbry is, however, a much larger species.

Specimens examined. GRAND CAYMAN: halfway between North Sound and Red Bay (ANSP).

Lacteoluna (Stauroglypta) caymanensis Pilsbry

Lacteoluna caymanensis Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 232, text fig. 1 (halfway between North Sound and Red Bay, Grand Cayman). [Holotype, ANSP no. 150890.]

Lacteoluna cistula Pilsbry 1942, Nautilus **56**: 5, pl. 1, fig. 7 (branching of Forest Glen Road from Further Land Road, north side area, Grand Cayman). [Holotype, British Museum.]

Remarks. Related to *L. summa* Pils., but being very much smaller. It is also related to *L. sprete* C. B. Adams of Jamaica.

Specimens examined. GRAND CAYMAN: halfway between North Sound and Red Bay (ANSP; MCZ).

Proserpinula lewisi Pilsbry

Proserpinula lewisi Pilsbry 1949, Nautilus **63**: 42, pl. 3, fig. 2 (Cayman Brac). [Holotype, British Museum; paratypes, ANSP no. 187673.]

Remarks. This species is related to *P. infortunata* Bland of Jamaica, but differs by being a little smaller and subglobose in outline and not flattened as is the Jamaican species.

Specimens examined. LITTLE CAYMAN: near western end (USNM).

CAYMAN BRAC: (ANSP).

Lacteoluna (Aerotrochus) trochella Wurtz

Lacteoluna (Aerotrochus) trochella Wurtz 1950, Proc. Acad. Nat. Sci. Philadelphia **102**: 104, pl. 2, fig. 9 (where the north-south road intersects the road paralleling the north shore, Grand Cayman). [Holotype, ANSP no. 186189.]

Remarks. According to Wurtz this species is related to the Jamaican *L. subpyramidalis* C. B. Adams.

Specimens examined. GRAND CAYMAN: $\frac{1}{4}$ mile S of North Shore (ANSP).

Lacteoluna (Aerotrochus) caymanbracensis Pilsbry

Lacteoluna caymanbracensis Pilsbry 1949, Nautilus **63**: 42, pl. 3, fig. 1 (Cayman Brac). [Holotype, ANSP no. 272860.]

Remarks. Pilsbry relates this species to the much larger Jamaican *L. ptychodes* Pfr. It is also closely related to *L. trochella* Wurtz from Grand Cayman.

Specimens examined. LITTLE CAYMAN: N coast near western end; near Blossom Village (both USNM).

CAYMAN BRAC: behind Stake Bay (ANSP).

***Lacteoluna (Stauroglypta) steveni* Pilsbry**

Lacteoluna steveni Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 232, text fig. 2 ($\frac{1}{2}$ mile from North Sound, Grand Cayman). [Holotype, ANSP no. 150891.]

Remarks. As with the other species in the subgenus *Stauroglypta*, this species is related to the *L. spreta* complex of Jamaica.

Specimens examined. GRAND CAYMAN: between George Town and North Sound (ANSP; MCZ).

ORTHALICIDAE

***Orthalicus undatus jamaicensis* Pilsbry**

Oxystyla undata jamaicensis Pilsbry 1899, Man. of Conch. (2) **12**: 107, pl. 27, figs. 19–23 (Rock Fort near Kingston; Hope River; Yallahs) [Holotype, ANSP no. 61885a]; 1942, Nautilus **56**: 5 (George Town, Grand Cayman).

Remarks. This species is a rather recent introduction on Grand Cayman. It was reported by Pilsbry (1942, p. 5). Three specimens were collected by Mr. C. B. Lewis at George Town in 1938. The introduction was most certainly from Jamaica where it is very abundant in the vicinity of Kingston. Even the Jamaica race is believed to have been introduced in early post-Columbian times from Trinidad. The nominate species has been introduced in the Bahamas on New Providence and Andros Islands (Clench 1942, p. 61). It is quite surprising that no members of the Bulimulacea managed to reach the Caymans other than this introduced species. Though various genera in this superfamily are widely distributed throughout the West Indies they have failed to reach, on a specific level, the richness such as exhibited by the Camaenidae, Urocoptidae, Cerionidae, Chondropomidae and Helicinidae. Elsewhere, as in Central and South America, the Bulimulacea are exceedingly rich in both species and genera.

Specimens examined. GRAND CAYMAN: George Town (MCZ).

This record is based upon two specimens collected in June 1941 by William Osment.

CERIONIDAE¹

Cerion pannosum Maynard

Plate 63, figs. 1-13

Strophia pannosa Maynard 1889, Contributions to Science **1**: 10, pl. 1, figs. 1-2, 13; pl. 2, figs. 1a-d (west end of Little Cayman). [Lectotype, MCZ no. 246343.]

Strophia levigata Maynard 1889, Contributions to Science **1**: 12, pl. 2, figs. 2-2b (west end of Little Cayman). [Lectotype, MCZ no. 247021.]

Strophia intermedia Maynard 1889, Contributions to Science **1**: 13, pl. 2, figs. 3-3b (south side of Little Cayman and south side of Cayman Brac). [Holotype, MCZ no. 76067.]

Strophia acuta Maynard 1886, Contributions to Science **1**: 15, pl. 2, figs. 4-4b (south side of Little Cayman). [Lectotype, MCZ no. 247022.]

Strophia festiva Maynard 1889, Contributions to Science **1**: 17, pl. 2, figs. 5a-c (western path, $\frac{1}{2}$ mile from the sea, Little Cayman). [Lectotype, MCZ no. 247023.]

Strophia picta Maynard 1889, Contributions to Science **1**: 18, pl. 2, figs. 6-6b (west end of Little Cayman). [Lectotype, MCZ no. 247019.]

Strophia lineata Maynard 1889, Contributions to Science **1**: 20, pl. 2, figs. 7-7b (south side of Little Cayman and south side of Cayman Brac). [Lectotype, MCZ no. 246346.]

Strophia copia Maynard 1889, Contributions to Science **1**: 22, pl. 1, figs. 1, 3, 7-12; pl. 2, figs. 8-8b (west end of Cayman Brac and north side of Little Cayman). [Holotype, MCZ no. 76065.]

Strophia parva Maynard 1889, Contributions to Science **1**: 24, pl. 2, figs. 9-9b (west end of Cayman Brac). [Lectotype, MCZ no. 246423.]

Strophia glaber Maynard 1889, Contributions to Science **1**: 25, pl. 2, figs. 10-10b (west end of Cayman Brac). [Lectotype, MCZ no. 246344.]

Strophia perplexa Maynard 1889, Contributions to Science **1**: 71, pl. 7, figs. 15-15a (Cayman Brac, 2 miles from west end). [Lectotype, MCZ no. 246345.]

Strophia nitela Maynard 1889, Contributions to Science **1**: 73, pl. 7, figs. 16-16a (west end of Little Cayman). [Lectotype, MCZ no. 247020.]

Strophia fusca Maynard 1889, Contributions to Science **1**: 77, pl. 7, figs. 19a; text figs. 12a-b (west end of Little Cayman). [Holotype, MCZ no. 76069.]

Description. Shell reaching 31 mm. in length, solid in structure, sculptured and minutely umbilicated. Color grayish white

¹Rather recently, H. B. Baker suggested a change of spelling of this family to Ceriidae (1957, p. 141). This was adopted later by Taylor and Sohl (1962, p. 11). Cerionidae was introduced by Pilsbry in 1901 and has been in continuous use since that time. Even if Ceriidae is the correct way to form the family name, such a change at this late date will only add confusion.

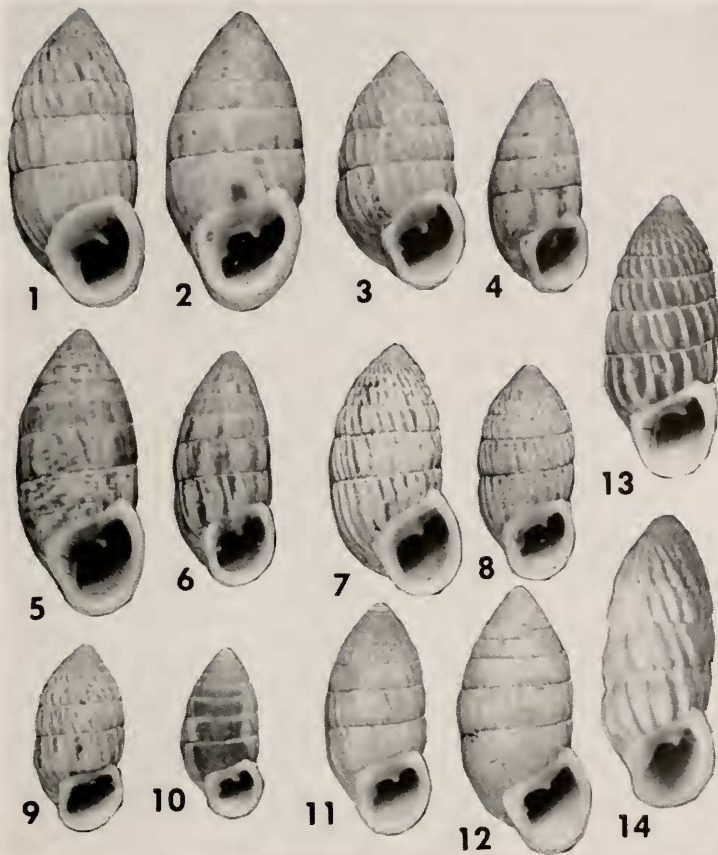


Plate 63

Fig. 1. *Strophia pannosa* Maynard, lectotype, MCZ no. 246343. Fig. 2. *S. levigata* Maynard, lectotype, MCZ no. 247021. Fig. 3. *S. intermedia* Maynard, holotype, MCZ no. 76067. Fig. 4. *S. acuta* Maynard, lectotype, MCZ no. 247022. Fig. 5. *S. festiva* Maynard, lectotype, MCZ no. 247023. Fig. 6. *S. picta* Maynard, lectotype, MCZ no. 247019. Fig. 7. *S. lineota* Maynard, lectotype, MCZ no. 246346. Fig. 8. *S. copia* Maynard, holotype, MCZ no. 76065. Fig. 9. *S. parva* Maynard, lectotype, MCZ no. 246423. Fig. 10. *S. glaber* Maynard, lectotype, MCZ no. 246344. Fig. 11. *S. perplexa* Maynard, lectotype, MCZ no. 246345. Fig. 12. *S. nitela* Maynard, lectotype, MCZ no. 247020. Fig. 13. *S. fusca* Maynard, holotype, MCZ no. 76069 (all 1.24 \times). Fig. 14. *S. nanus* Maynard, lectotype, MCZ no. 246737 (2.7 \times).

to marbled with a purplish brown. Whorls 10 to 11, slightly convex the first 7 whorls forming the tapering apex. Suture well defined. Aperture subcircular and with a well developed parietal ridge. Lip thickened and reflected. Parietal tooth well developed and continuing within for one-half whorl. Columellar tooth small and short. Protoconch of one and one-half whorls, white, the last whorl being very finely costate. Remaining whorls with axial ribs which vary in number and spacing on the body whorl in specimens in a single population and even more so in different populations. A few populations, particularly those on Little Cayman near Blossom Village are nearly smooth but this type of sculpture variation is fairly common in this genus.

length	width	
31.0 mm.	13.5 mm.	Lectotype of <i>S. pannosa</i> Maynard
30.5	15.0	Lectotype of <i>S. levigata</i> Maynard
29.5	12.5	Lectotype of <i>S. festiva</i> Maynard
28.0	11.5	Holotype of <i>S. fusca</i> Maynard
27.5	12.0	Lectotype of <i>S. nitela</i> Maynard
26.0	12.5	Lectotype of <i>S. lineola</i> Maynard
25.0	13.0	Holotype of <i>S. intermedia</i> Maynard
24.0	9.5	Lectotype of <i>S. picta</i> Maynard
23.5	10.0	Lectotype of <i>S. perplexa</i> Maynard
22.0	9.0	Lectotype of <i>S. acuta</i> Maynard
21.5	10.0	Holotype of <i>S. copia</i> Maynard
19.0	9.0	Lectotype of <i>S. parva</i> Maynard
17.5	8.0	Lectotype of <i>S. glaber</i> Maynard

In several cases Maynard failed to select a holotype, so lectotypes have been selected here which agree as closely as can be determined with his descriptions and measurements.

Measurements of 20 paratypes of *S. pannosa* Maynard

length	width	length	width
30.5 mm.	13.0 mm.	28.0 mm.	13.0 mm.
29.5	15.0	28.0	12.5
29.5	14.0	27.0	14.0
29.5	13.0	27.0	13.0
29.0	13.5	27.0	12.5
29.0	13.5	26.5	13.5
29.0	12.5	26.0	14.5
28.5	14.5	25.0	12.0
28.5	13.0	24.5	11.5
28.5	12.5	23.5	11.5

Remarks. All names in the synonymy above refer to but a single species. These are but different populations which show a considerable amount of variation between them. There is also, however, much variation within each population.

Pilsbry (1901) had admitted *C. levigatum* (Maynard) as a valid species, basing his judgement on Maynard's remarks and the few selected specimens which he had received from Maynard. These are the "smooth" forms which occur in greater numbers on Little Cayman Island, mainly in the vicinity of Blossom Village. Most of the lots collected by Maynard also contain costate specimens in limited numbers.

Cerion pannosum may have been derived from *C. iostomum* Pfr. of the south coast of Cuba.

Specimens examined. LITTLE CAYMAN: north side; western end; south side (all MCZ); 1 mile E of Jackson Point: Blossom Village; north coast opposite Sparrowhawk Hill; between Blossom Village and Salt Rock; east side of Bloody Bay; western edge of mangrove swamp near Blossom Village; western end; E of entrance to Reef Harbour; Owen Island; in bog E of Blossom Village; Rocky Point (all USNM).

CAYMAN BRAC: Buccaneer's Inn; West End Point; 2 miles from west end; south side (all MCZ); eight populations from various areas on this small island (Grace O. Hunter; MCZ); Booby Point; south shore, 2½ miles E of West End Point; the Bight; Stake Bay; road across island from Custom House (all USNM).

***Cerion martinianum* Küster**

Plate 62, figs. 3-4

Pupa martiniana Küster 1844, Conchylien-Cabinet (2) 1: pt. 15, p. 75, pl. 11, figs. 3-4 (West Indies [Grand Cayman]).

Cerion caymanense 1902, Manual of Conch. (2) 14: 196, pl. 44, figs. 85-86 (Grand Cayman); Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia 82: 235. [Holotype, ANSP; paratypes, MCZ no. 88904.]

Description. Shell reaching 28 mm. in length, solid in structure, sculptured and minutely umbilicate. Color a grayish white to light brown. Whorls 9 or 10, slightly convex, the first 7 or 8 forming the tapering apex. Suture well defined. Aperture subcircular and with a well developed parietal ridge. Lip thickened and reflected. Parietal tooth well developed and

continuing within for one-half whorl. Columellar tooth small and short. Protoconch of one and one-half whorls, white and smooth. Remaining whorls with numerous and rather fine axial ribs. On most specimens examined there is a slight depression on each rib just below the suture.

length	width			
28.0 mm.	11.5 mm.	Grand Cayman		
21.5	11.0	"	"	
20.0	9.0	"	"	
18.0	8.7	"	"	
18.0	9.5	"	"	
18.0 mm.	9.0 mm.	Paratypes of <i>C. caymanense</i> ,	Grand Cayman	
16.5	8.0	"	"	"
16.0	9.0	"	"	"
19.0 mm.	8.0 mm.	10 miles E of George Town,	Grand Cayman	
17.5	8.5	"	"	"
16.5	8.0	"	"	"
16.0	8.4	"	"	"
15.0	7.5	"	"	"
13.5	7.5	"	"	"

Remarks. The measurements above give some idea of the range of size as well as the variation in the proportions of length and width. All are adults.

Lewis (in Pilsbry 1942, p. 6) has stated that this *Cerion* is very abundant along the entire western coast of Grand Cayman. He could find no living examples along the eastern coast. "It is very curious, however, that the sand which extends behind the storm beach some 200 yards to the foot of the abruptly rising Miocene 'Bluff' is strewn with dead shells. The people of these parts all claim that the shells were washed up during the terrible hurricane of 1932. They were strange to the people of the district, and as a result many bottles were filled and kept as curiosities."

One wonders and speculates as to what may have happened to the biota in the Caymans and the south coast of Cuba during the four day stay of "Flora," in Oct. 1963, the most damaging hurricane known in the weather history of the West Indies.

Pilsbry (1930, p. 234) considered his *C. caymanense* as "only a small race or form of *C. martinianum*."

There appears to be a close relationship between *C. martinianum* and *C. sanctacruzence* Aguayo and Jaume. This lat-

ter species occurs at Santa Cruz del Sur and the cays which make up the archipelago of the Jardines de la Reina on the south coast of Camagüey Province, Cuba.

Specimens examined. GRAND CAYMAN: 1 mile N of George Town; Bodden Town; 10 miles E of George Town (all MCZ); Red Bay; near Rum Point; midway between Conch Point and Palmetto Point; 1 mile W of Red Bay; about $1\frac{1}{2}$ miles E of Northwest Point (all USNM).

***Cerion nanus* Maynard**

Plate 63, fig. 14

Strophia nana Maynard 1889, Contributions to Science **1**: 27, pl. 2, figs. 11-11d (west end of Little Cayman). [Lectotype, MCZ no. 246737.]

Cerion nanus Maynard. Pilsbry 1901, Manual of Conch. (2) **14**: 183, pl. 27, figs. 1-3.

Description. Shell small, reaching 17.5 mm. in length, the greater number being between 15 and 17 mm. Color a dull gray. Whorls $8\frac{1}{2}$ to 10, slightly convex, the first 5 whorls forming the tapering cone. Spire extended. Aperture subcircular. Outer lip reflected but not turned backward. Parietal lip with a well formed and straight ridge. Parietal tooth large but extending within no more than $\frac{1}{4}$ of a whorl. Columellar tooth small and extending within about $\frac{1}{3}$ of a whorl. Umbilicus rimate and exceedingly small. Suture well defined. Sculpture consisting of numerous axial ridges which are depressed slightly just below the suture. Protoconch consisting of 2 whorls which are opaque and glass-like.

length	width	
14.5 mm.	5.5 mm.	Lectotype, <i>C. nanus</i> Maynard
17.0	6.5	Paratype
16.0	6.0	"
15.0	6.5	"
15.0	6.0	"
14.0	6.0	"
14.0	6.0	"
14.0	5.5	"

Remarks. Maynard collected this species during the winter of 1888 and the area was again collected by Bartsch in 1930. It would be of considerable interest to know if this colony still exists after a period of more than 33 years. This may well be,

as little or no development has been attempted on this small island where there is but little soil. Admiralty chart no. 462 gives the height on the western end as 25 to 30 feet, possibly high enough to give some protection against hurricane seas. Maynard stated:

"The dwarf *Strophias* occur in a space which is only five or six yards wide by twenty long, on this little key, and as they were rigidly confined to this narrow area . . . I consider that this species has the most restricted range of any animal with which I am acquainted. This spot is on the west end of Little Cayman, on the eastern most of the two paths that cross the key, near their junction.

"In habit, this species is social, and I found many of them clinging to a kind of heath-like plant which was about eighteen inches high, and which had small gray leaves of nearly the same color as the shells, and which on being crushed, gave out a strong odor. Here these *Strophias* were exposed to the burning rays of a nearly vertical sun, and the heat in which they lived during the day, was intense . . .

"It is evident that in this species, we have a *Strophia* dwarfed to an extreme degree, from feeding on the pungent leaves of the plant described, and isolated as it is by surrounding areas of rough, jagged rocks . . . the ground was strewed with thousands of dead shells, showing that mortality among them was great . . ."

The mortality rate was probably no greater than in most *Cerion* populations. The shells of dead specimens can last for many years in an area composed of limestone and little soil cover. *Cerion microdon* Pils. and Van. was described in 1896 (Gibara, Cuba) from dead specimens. C. G. Aguayo and I collected dead specimens in the same area in 1945. No live specimens of this species have ever been collected at Gibara or anywhere else for that matter.

Cerion microdon was recorded by Bartsch in his unpublished journal from Cotton Cay, Cay Sal Bank, Bahamas. "Here on cleared ground we found millions of a very small *Cerion*. These were all dead and that in spite of the fact that the ground was not burned over."

This small colony of *C. nanus* had become dwarfs probably because of natural selection and not because of feeding on the

heath-like plant mentioned by Maynard above. Survival in an environment of this sort would certainly favor the smaller individuals because of an inadequate food supply. Most species of *Cerion* feed upon lichens and not upon herbaceous plants. I have seen this same situation at the Balcón de las Dames, Guarda la Vaca, Banes, Cuba. The habitat here was exposed coastal limestone some 20 to 50 feet above the sea. In the depressions where there was a little soil there were a few dwarf sea grapes (*Cocoloba* sp.) 2 to 3 feet high. Some twenty-odd depressions were examined before any *Cerion hessei* were found and at this spot only a few specimens were obtained, and several of these are the smallest on record. The area of this small colony was about a yard square. Variation in size was considerable, ranging from 9 mm. to 22 mm.

Cerion hessei Clench and Aguayo

millimeters *	9	10	11	12	13	14	15
no. of specimens	1	1	11	18	11	11	7
millimeters	16	17	18	19	20	21	22
no. of specimens	6	8	5	1	0	0	1

* Measurements made to the nearest millimeter.

Some 42 years later in 1930, Paul Bartsch of the United States National Museum collected at this same locality of Maynard. I quote from his unpublished journal "Station 4 was at about halfway between Blossom Village and Salt Rock in a stretch of woodland where in a space some 50 yards in length and 20 in width we found Maynards *Cerion nanus* quite abundant, and we gathered two 8 oz. bottles full of them." The following measurements are from this series of specimens. All measurements are based upon adults and are selected at random.

length	width	
17.5 mm.	6.0 mm.	Little Cayman, halfway between Blossom Village and Salt Rock
17.5	6.0	
17.0	6.5	
17.0	6.0	
16.5	6.5	
16.5	6.5	
16.0	6.0	
15.5	6.5	
15.5	5.5	
15.5	5.5	
14.0	6.0	

In the aggregate, these measurements are slightly higher than those of Maynard, but Bartsch had three or four collectors while Maynard was alone. The sample made by Bartsch probably gave better coverage of the colony than the more limited coverage by Maynard.

Cerion nanus does not appear to be closely related to the other species of *Cerion* on the Cayman Islands or to any *Cerion* from the south coast of Cuba.

Specimens examined. LITTLE CAYMAN: west end of Little Cayman (MCZ; USNM); eastern of two paths, west end of Little Cayman (USNM); between Blossom Village and Salt Rock (USNM).

UROCOPTIDAE

***Microceramus caymanensis* Pilsbry**

Microceramus caymanensis Pilsbry 1942, *Nautilus* **56**: 2, pl. 1, fig. 8 (Battle Hill, interior of eastern end, Grand Cayman) [Holotype, British Museum; paratypes, ANSP no. 279021.]

Remarks. This species is quite variable in size and in the number of whorls, varying from 7 to 9 whorls. All other characters appear to be the same.

Pilsbry (1942, p.6) relates this species to similar species which occur in Central America, Florida, Jamaica, Hispaniola and Cuba. "The Grand Cayman form appears somewhat nearer to the West Indian species."

Specimens examined: GRAND CAYMAN: Battle Hill; $\frac{1}{4}$ mile S of north shore (both ANSP).

LITTLE CAYMAN: near Blossom Village; E of Reef Harbour entrance; halfway across W end of island; N side near East Point (all USNM).

CAYMAN BRAC: on road across the island from the Custom House (USNM).

***Pinaria perpusillus* Wurtz**

Microceramus perpusillus Wurtz 1950, *Proc. Acad. Nat. Sci. Philadelphia* **102**: 105, pl. 2, fig. 10 (where the north road intersects the road paralleling the north shore, Grand Cayman) [Holotype, ANSP no. 186185.]

Remarks. Based upon shell characters, this species belongs to the genus *Pineria* and it is related to *P. beathiana* Poey from the Sierra de Caballos, Isle of Pines, Cuba.

Specimens examined. GRAND CAYMAN: north shore road at intersection (ANSP).

***Brachypodella (Cyclauchén) caymanensis* Pilsbry**

Brachypodella caymanensis Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 233, pl. 17, figs. 8–10 (between Red Bay and North Sound, Grand Cayman). [Holotype, ANSP no. 150046.]

Brachypodella erratica Pilsbry 1930, Proc. Acad. Nat. Sci. Philadelphia **82**: 234, pl. 17, figs. 6–7a ($\frac{1}{2}$ mile from North Sound, Grand Cayman). [Holotype, ANSP no. 150050.]

Remarks. This species is closely related to *B. insulaecygni* Clapp from Swan Island, differing however, by having more numerous and smaller axial ribs than found in *insulaecygni*. Clapp (1914, p. 99) relates *B. insulaecygni* Clapp of the Swan Islands to *B. minuta* Pfeiffer of eastern Cuba; and Pilsbry (1930, p. 245) relates *B. caymanensis* to the Swan Island species and placed both in the subgenus *Cyclauchén* which he created for these two species. In essence, both these species may be quite old and have become well differentiated. The genus *Brachypodella* Beck has a peculiar distribution: West Indies (other than central and western Cuba and the Bahamas) and from Venezuela and Colombia north to the isthmus of Tehuantepec, Mexico. All are mainly ground forms living under stones.

B. erratica Pils. is but a slight variant of *caymanensis*. The minor differences in the spire are generally determined by where the plug is made and where the spire breaks. In most species in this remarkable family the early whorls are lost. At or approaching maturity an internal plug is formed, closing off several of the early whorls. In time these early whorls usually break off at the point where the plug is attached to the inner surface of the shell.

Specimens examined. GRAND CAYMAN: south of North Sound (ANSP; MCZ).

LITTLE CAYMAN: north side near East Point; east of Reef Harbour entrance; western end (all USNM); halfway across western end (USNM; MCZ).

CAYMAN BRAC: road leading across the island from Custom House (USNM).

FRUTICICOLIDAE

Hemitrochus streator *Pilsbry*

Helix (*Hemitrochus*) *streator* Pilsbry 1889, Proc. Acad. Nat. Sci. Philadelphia **41**: 413, pl. 12, fig. 1 (Cayman Islands). [Holotype, ANSP no. 60276; paratypes, USNM no. 101417.]

Hemitrochus caymanensis 'Maynard' Pilsbry 1893, Man. of Conchology (2) **8**: 241, pl. 56, figs. 10-12 (Little Cayman Island). [Holotype, ANSP no. 62591a; paratypes, USNM no. 187473; MCZ no. 31784.]

Cepolis (*Hemitrochus*) *caymanensis* Pilsbry 1942, Nautilus **56**: 5, pl. 1, figs. 10-11a (Cayman Brac).

Remarks. I cannot separate specimens of these two species. It occurs on all three islands and it could easily be transported from one island to another by inter-island commerce. It lives on trees and bushes and other vegetation.

Specimens examined. GRAND CAYMAN: (MCZ); between Southwest Point and Red Bay (USNM).

LITTLE CAYMAN: halfway between Blossom Village and Salt Rock; western end in elevated portion; 1 mile E of Jackson Point; near Blossom Village (all USNM).

CAYMAN BRAC: south side, about 2 miles E of Southwest Point; Stake Bay Point; Booby Point (all USNM).

Hemitrochus lewisiana *Pilsbry*

Cepolis (*Hemitrochus*) *lewisiana* Pilsbry 1942, Nautilus **56**: 4, pl. 1, figs. 14-14a (Battle Hill, interior of eastern end of Grand Cayman, Cayman Islands). [Holotype, British Museum.]

Remarks. According to Pilsbry (1942, p. 5) this species is closely related to *H. streator* but differs by having a thinner, unicolored shell, with the umbilicus more widely open. It is known only from Grand Cayman.

REFERENCES

- Abbott, R. T. 1958. The Marine Mollusks of Grand Cayman Island, British West Indies. Monographs, Acad. Nat. Sci. Philadelphia **11**: 138.
- Anonymous 1961. Cayman Islands. Report for the Years 1959 and 1960. Her Majesty's Stationery Office, London, pp. 1-46, map.
- Barbosa, F. S., B. Hubendick, E. T. A. Malek and C. A. Wright 1961. The Generic Names *Australorbis*, *Biomphalaria*, *Platytafhius*, *Taphius* and *Tropi-corbis* (Mollusca, Planorbidae). Ann. and Mag. of Nat. Hist. (13) **4**: 371-375.
- Bartsch, P. 1931. Further Explorations for Mollusks in the West Indies. Publication no. 3111, Explorations and Field Work of the Smithsonian Institution in 1930, pp. 91-102, Washington, D.C.
- Bartsch, P. 1942. The Cyclophorid Operculate Land Mollusks of America. United States National Mus. Bull. **181**: 71-82.
- Clapp, W. F. 1914. List of Land Shells from Swan Island, with Descriptions of Five New Species. Nautilus **27**: 97-101.
- Clench, W. J. 1938. Origin of the Land and Freshwater Mollusk Fauna of the Bahamas, with a List of the Species Occurring on Cat and Little San Salvador Islands. Bull. Mus. Comp. Zool. **80**: 481-541.
- Clench, W. J. 1942. Land Shells of the Bimini Islands, Bahama Islands. Proc. New England Zoological Club **19**: 53-67.
- Clench, W. J. and R. D. Turner 1948. A Catalogue of the Family Truncatellidae with Notes and Descriptions of New Species. Occasional Papers On Mollusks **1**: 157-212.
- Clench, W. J. and R. D. Turner 1950. Edward Chitty, with a Bibliography and a Catalogue of his Species of Jamaica Land Shells. Occ. Papers of the Museum of the Institute of Jamaica, no. 1, pp. 1-12.
- Clench, W. J. 1961. Land and Freshwater Mollusks of Caicos; Turks, Ragged Islands and Islands on the Cay Sal Bank. Occasional Papers On Mollusks **2**: 229-259.
- Clench, W. J. 1963. Land and Freshwater Mollusks of the Crooked Island Group, Bahamas. Bull. Mus. Comp. Zool. **128**: 393-414.
- Grant, C. 1940. The Herpetology of the Cayman Islands. Bull. Inst. of Jamaica, Science Series no. 2, pp. 1-65.
- Matley, C. A. 1926. The Geology of the Cayman Islands (British West Indies) and their relation to the Bartlett Trough. Quarterly Jour. Geol. Soc. London **82**: 352-387, map.
- Pilsbry, H. A. 1901. Manual of Conchology (2) **14**: 174-191.

- Pilsbry, H. A. 1930. Land Mollusks of the Caribbean Islands, Grand Cayman, Swan, Old Providence and St. Andrew. Proc. Acad. Nat. Sci. Philadelphia **82**: 221-261.
- Pilsbry, H. A. 1930. Land Mollusks of the Canal Zone, The Republic of Panama, and the Cayman Islands. Proc. Acad. Nat. Sci. Philadelphia **82**: 339-365.
- Pilsbry, H. A. 1942. Land Mollusca of the Cayman Islands collected by the Oxford University Biological Expedition, 1938. Nautilus **56**: 1-9.
- Pilsbry, H. A. 1949. Land Mollusks of Cayman Brac. Nautilus **63**: 37-48.
- Pinchot, Gifford 1930. To the South Seas. John C. Winston Co., Philadelphia, pp. 27-28.
- Proctor, G. R. 1959. Observations of Navassa Island. Quart. Jour. of the Jamaica Group of the Geologists' Association, London **2**: 49-54.
- Taylor, D. W. and N. F. Sohl 1962. An Outline of Gastropod Classification. Malacologia **1**: 7-32.
- Turner, R. D. 1957. Charles Johnson Maynard and his work in Malacology. Occasional Papers On Mollusks **2**: 137-152.
- Turner, R. D. 1960. Land Shells of Navassa Island, West Indies. Bull. Mus. Comp. Zool. Harvard College **122**: 233-244.
- Wurtz, C. B. 1950. Results of the Catherwood-Chaplin West Indies Expedition, 1948. Part IV. Land Snails of North Cat Cay (Bahamas), Cayo Largo (Cuba), Grand Cayman, Saint Andrews and Old Providence. Proc. Acad. Nat. Sci. Philadelphia **102**: 95-110.